



Profile of critical thinking skills of SMPN 37 Semarang students in learning science material on the human respiratory system

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ABSTRACT

Students' critical thinking skills are one of the competencies that must be trained in the 21st century. Through this competency, students are expected to be able to be rational, not only in science learning but also in solving problems. This study aims to obtain a description of the critical thinking skills of students in each aspect of critical thinking skills in human respiratory system material. This research method is descriptive quantitative. This research aims to provide an accurate description of the characteristics of a situation or a phenomenon. This research used random sampling technique. This research instrument is in the form of HOTS-based Daily Test essay questions on human respiratory system material adapted to the Problem Based Learning model. The data of the research was taken from the results of students' answers are analyzed using a rubric that is adjusted to the aspects of critical thinking skills indicators. Based on the results of this research, the average percentage of critical thinking skills is 56.59% which is classified in the low category. The highest percentage is the interpretation aspect, the result is 68.80%, categorized as moderate. The lowest percentage is the inference. The result is 33.35% and classified as very low.

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INTRODUCTION

In line with the times, science and technology are also developing very fast and increasingly sophisticated, with an increasingly broad role. As a result of this, the development of the world of education at this time also leads to a learning process that must be student centered, where students learn to construct their own knowledge (Handayani et al., 2023). Thus, teachers who have creative characters are needed to provide learning techniques to students in developing critical thinking skills in answering various problems and challenges in learning. According to Page (2007) & Fascione (1990) in (Budi M & Ghofar CW, 2017) which states that critical thinking is related to

high-level cognitive such as the ability to process analysis, evaluation, synthesis and interpretation. Where these activities are the basis for performing critical and metacognitive thinking skills. Nations whose people are not ready for change will certainly be crushed by the enormity of the times and the rapid advancement of technology in the 21st century. Therefore, the quality of education must also be improved. (Nurwanti, 2022) states that schools as educational institutions are required to prepare students to have the ability to think critically and problem solve, critical thinking (creative thinking), communication and collaboration or commonly known as 4C.

The results of the PISA (Program for International Student Assessment) test in 2018 showed that the average student in Indonesia in the field of science skills fell compared to the results in 2015. Indonesia is also still ranked 71 out of 79 participating countries. This is in line with research conducted by (Sari & Nurwahyunani, 2016) which states that the profile of science literacy according to PISA in public junior high school students in the city of Semarang has an average value that falls into the moderate category. Where the achievement of students' science literacy in answering PISA science literacy questions is highest in level 1 questions, while the lowest achievement of students' science literacy is in level 6 questions. One of the factors causing Indonesia's low achievement in the PISA study is the low ability of students to solve high-level problems. Meanwhile, the questions used in the PISA study are questions with contextual problems in everyday life that aim to measure students' high-level thinking skills where in solving them students are required to think critically (OECD, 2019). In other words, the results of the PISA study show that the critical thinking skills of Indonesian students are still relatively low.

The low results of the PISA study, especially in the field of science skills, also indicate that the understanding of science concepts is still low. In fact, critical thinking skills can be trained through learning natural science. However, the results of research conducted by (Rahayu, 2018) shows that in science learning, students absorb information passively during the learning process and then remember the material only when taking tests. Learning like this will not be able to meet the demands in the field of education because students do not gain experience to develop students' critical thinking skills (Fahmi & Irhasyuarna, 2019).

This is in line with the results of observations at SMPN 37 Semarang which show that learning is still one-way (teacher centered learning) and has not trained students' critical thinking skills. Critical thinking skills are closely related to science subjects where concepts, theories and formulas must be understood deeply through the process of finding out and understanding the surrounding environment. Through the process of learning science, students can be trained to think critically because basically critical thinking is not innate from childhood, but needs to be taught and trained in the learning process. One way to train critical thinking skills is through giving questions or student worksheets that direct students to higher-level thinking skills (Putri et al., 2021). Students' critical thinking skills can be accommodated in the material of the respiratory system in humans.

The material of the human respiratory system at the junior high school level has basic competencies in the form of the ability of students to analyze the respiratory system in humans and understand disorders of the respiratory system, as well as efforts to maintain the respiratory system and present work on efforts to maintain respiratory system health. The two basic competencies require students to train their critical thinking skills so that in carrying out the learning process of human respiratory system material, teachers use the Problem Based Learning model by presenting material that is closely related to phenomena in the daily lives of students. Learners are expected to identify the main problem or source of the problem that has an impact on the emergence of other problems. Then, from the problem, learners can come up with logical problem solving ideas so that they can build their critical thinking skills (Achmad, 2007) in (Fahmi & Irhasyuarna, 2019).

Based on the above background, the purpose of this study is to obtain a description of the critical skills of students in each aspect of critical thinking skills according to (Facione, 2011) in

human respiratory system material. The results obtained later can be a reflection for teachers regarding the learning that has been done, as well as information for teachers to provide feedback and motivation to students to continue trying to improve the critical thinking skills of students.

RESEARCH METHODOLOGY

This research method is descriptive quantitative, where this research aims to provide an accurate description of the characteristics of a situation or a phenomenon. Sampling using random sampling technique, in which the sample is selected randomly or freely according to the will of the researcher. The subjects of this study were students of class VIII A SMPN 37 Semarang in the academic year 2022 - 2023 totaling 32 children.

This research instrument is in the form of HOTS-based Daily Test essay questions on human respiratory system material adapted to the Problem Based Learning model. Then the data taken from the results of students' answers are analyzed using a rubric that is adjusted to the aspects of critical thinking skills indicators according to (Facione, 2011) modified by (Fithriyah et al., 2016). Details of the description of indicators can be seen in Table 1 below.

Table 1.

Indicators of critical thinking skills		
No.	Indicator	Sub Indicator
1.	Interpretation	Can write what is asked by the question clearly and precisely
2.	Analysis	Can write down what to do in solving the problem
3.	Evaluation	Can write down the solution to the problem
4.	Inference	Can draw conclusions from what is asked logically

In Table 1. indicators of critical thinking skills according to (Facione, 2011) there are four aspects, namely interpretation, analysis, evaluation and inference. Where these aspects have sub-indicators that have been described in the table.

Table 2.

Critical thinking skills category interpretation	
Interpretasi	Category
$81,25 < X < 100$	Very high
$71,50 < X < 81,25$	High
$62,50 < X < 71,50$	Medium
$43,75 < X < 62,50$	Low
$0 < X < 43,75$	Very low

Table 2. explains the value in the form of interpretation numbers that will produce a category of how critical thinking skills are possessed by students in the process of learning IPA material on the respiratory system in humans. Where, the highest table is categorized by the interpretation number $81,25 < X < 100$. Meanwhile, the lowest table is interpreted with a number $0 < X < 43,75$.

RESULTS AND DISCUSSIONS

The results of the research conducted obtained the results of the critical thinking skills test of students in class VIII A SMPN 37 Semarang are still in the low category and still need to be improved. Most students are still confused in applying their knowledge, describing the explanation of an event, expressing the solution of the problem presented and in expressing their opinions in accordance with the events presented. This is because in the learning process the

teacher still uses the lecture method or learning still goes one way (teacher centered learning) and students tend to memorize a lot, so that the critical thinking skills of students have not played a role and are embedded in students. This is in line with the opinion expressed by (Snyder & Snyder, 2008) that students cannot solve problems due to a lack of critical thinking skills and learning that involves students memorizing too much will make students think less and understand the concept of material less.

Table 3.

Critical thinking ability data statistics	
Statistical elements	Interpretation
Amount	32
Mean	56,59
Standard deviation	6,31
Maksimum	67,00
Minimum	43,00

Table 3. above shows that the average score of students in class VIII A is 56.59%. Based on Table 2. the value of students has a low category of critical thinking ability of students. More specific results regarding the achievement of indicators are presented in Figure 1.

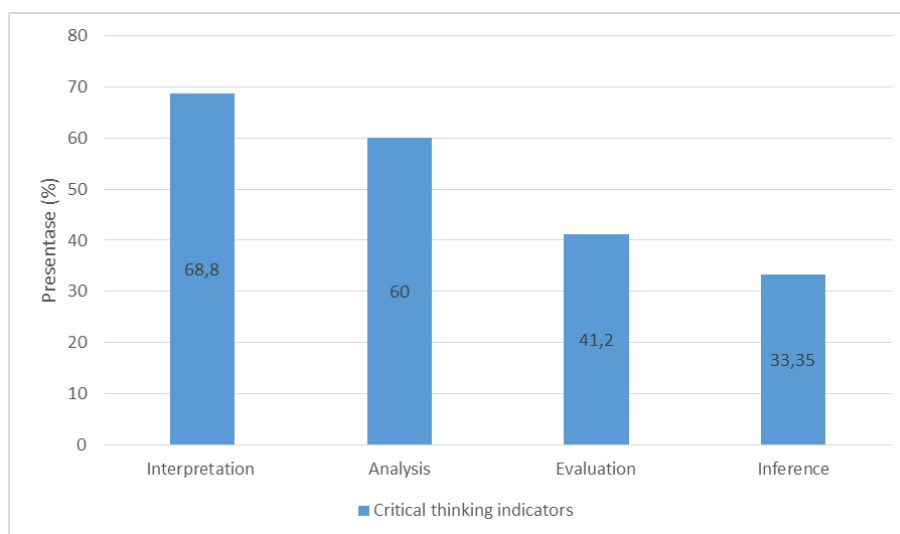


Figure 1. Graph of achievement of critical thinking skills indicators

In the results of the critical thinking data analysis above, which resulted in an average percentage of critical thinking skills of VIII A class students of 56.59% which is classified in the low category. The interpretation indicator in this study obtained the highest percentage of 68.80% which was classified as a moderate category. In this interpretation indicator, students are quite capable of writing the answers to what the questions ask clearly and precisely in the Daily Repeat essay on the respiratory system in humans, but not a few students are still confused in answering the questions. In line with research conducted by (Maslakhaturunni'mah et al., 2019) which states that in this interpretation indicator students are able to express the meaning of the problem statement or problem by writing down all the information known to students in their own language that is easy to understand and writing what must be solved from the given problem. Meanwhile, in this case students are able to write what the question asks about how the mechanism of the respiratory system in humans works. Learners are able to write the answers that are asked clearly and precisely according to the language of the learners.

The inference indicator in this study obtained the lowest percentage of 33.35% which was classified as very low. The inference indicator is the ability of students to identify important parts or reasons needed to draw reasonable conclusions. This indicator is still classified as very low because students have not been able to identify and solve problems to find a conclusion. In line with research conducted by (Delina, 2021) which states that students who have critical thinking skills in the low category on inference indicators are unable to fulfill critical thinking indicators such as being able to write the problem solving correctly or not being able to draw conclusions from the problem correctly.

Overall, it shows that students' critical thinking is still in the low category. This is because in the learning process the teacher still uses the lecture method or learning still goes one way (teacher centered learning) and tends to memorize a lot, so that the critical thinking skills of students have not played a role and are embedded in students. In line with research conducted by (Maslakhatunni' mah et al., 2019) which states that the critical thinking skills of junior high school students are still low or undeveloped. The low critical thinking ability is partly due to the learning that is applied is still dominant with teacher centered learning, so that it does not train students' critical thinking skills. This statement is in line with research conducted by (Patonah, 2014) that science learning in junior high schools still tends to be teacher centered learning so that it does not train students' critical thinking skills, learning still prioritizes memorization rather than developing thinking power, so that students' ability to convey their own ideas is still weak and dependent on others and less responsible to themselves.

The low critical thinking skills of students can have an adverse effect on further education, so students need to be trained in critical thinking skills so that students are able to make choices in analyzing their thoughts and drawing conclusions intelligently. Learners who are accustomed to being given the opportunity to think or think at a high level will be accustomed to distinguishing between facts and opinions, something wrong and right as well as knowledge and beliefs (Kurniawati et al., 2016). One way to improve students' critical thinking skills is to apply learning strategies or learning methods that can foster student curiosity. Learning models, learning strategies, learning methods or learning techniques used must be interactive, inspiring, challenging, fun, motivating, and encourage students' interest in learning.

Teachers are also required to be able to find the right learning method in order to train students' critical thinking skills. The right learning method will affect students' enthusiasm for learning and will affect students' critical thinking skills, especially in expressing their opinions. (Agboeze & Ugwoke, 2013) stated that learning models that have the potential to improve students' critical thinking skills are models that facilitate interaction between students such as debates, group discussions, asking open questions, solving problems, then evaluating and applying new concepts to solve problems in new situations.

CONCLUSION

Based on the research results of critical thinking skills of students in class VIII A SMPN 37 Semarang, the average percentage of critical thinking skills is 56.59% which is classified in the low category. The interpretation indicator obtained the highest percentage of 68.80% which is classified as a moderate category. In this interpretation indicator, students are quite capable of writing answers to what is asked by the question clearly and precisely on the Daily Test question on the material of the respiratory system in humans. Meanwhile, the inference indicator in this study obtained the lowest percentage of 33.35% which is classified as very low. This indicator is still classified as very low because students have not been able to identify and solve problems to find a conclusion. It is hoped that this research can be an initial description in further research on the critical thinking skills of students, especially at the junior high school level and science subjects.

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